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This paper outlines research procedures designed to approach systematically the junior college remedial problem--the remedial student's lack of success. The procedure is based on a theory of motivation (need achievement) and is designed to provide data for the following questions: (1) Are remedial students less motivated than non-remedial students? (2) Can the performance of remedial students be affected by increasing their motivation? and (3) Can the effectiveness of a remedial course be enhanced by modifying instruction in a way that promotes motivation? For each question, a research design is presented, with complete instructions for (1) selecting students, (2) administering test instruments and experimental treatments, (3) calculating statistics, and (4) making inferences. (HH)

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A DEVELOPMENTAL RESEARCH PLAN

FOR JUNIOR COLLEGE REMEDIAL EDUCATION

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INTRODUCTION

With this topical paper the ERIC Clearinghouse for Junior College Information introduces a new series designed for the purpose of stimulating junior college research. Each paper will focus on a research design which can be -- or has been -- used in a junior college study. Some papers will be written so that studies can be replicated with little or no design modification; others will report completed research. The intent is to focus attention of junior college educators on questions which are researchable and to suggest applicable research models.

The topical paper series furthers the Clearinghouse's junior college research information dissemination thrust. Other clearinghouse research-related publications include the monograph series and Junior College Research Review, both of which are published by the American Association of Junior Colleges. In addition to preparing these types of materials, the Clearinghouse collects, indexes, and abstracts research-related materials for input to Research in Education, a U.S. Office of Education publication.

Students of low academic achievement are a continuing concern in community colleges. The first clearinghouse monograph focussed exclusively on that problem._/ But who are those students? How may they be classified?

John E. Roueche, Salvage, Redirection or Custody? Remedial Education in the Community Junior College. (Washington: American Association of Junior Colleges, 1968).

Currently words are used without common meaning. A "low ability" student in one college may be "average" in another. His lack of "motivation" may be a factor contributing to his "failure to achieve;" his "disadvantaged" status may have resulted in his unwillingness to do "college level" work; and so on.

What do those words mean? More important, how design programs which will stimulate students placed in those categories to do academic work?

This paper presents a design by means of which the word "motivation" can be given a common referent. It sets out plans for assessing motivation, relating motivation to student performance and modifying instruction so that motivation is increased. Terms are given clear meaning by tying them to theory. Step by step procedures are explained -- from selecting a population sample to reporting findings.

Hopefully many junior college research directors will use these designs in their own institutions. The Regional Education Laboratory for the Carolinas and Virginia is particularly interested in helping many colleges in its area conduct studies based on these models. Other junior college-oriented groups may wish to follow the Laboratory's lead.

Special thanks to John Boggs, Program Associate in the Regional Lab, for preparing the paper and to the Laboratory for helping distribute it.

Arthur M. Cohen
Principal Investigator and Director
ERIC Clearinghouse for Junior
College Information

A MOTIVATIONAL RESEARCH PLAN FOR JUNIOR COLLEGE REMEDIAL EDUCATION

Statement of the Problem

Much has been claimed on behalf of the open-door college. Assertions have been advanced that community junior colleges "salvage human resources" (13:43), afford individuals "a second chance" (3:274), and implement the American dream of "universal education for all" (8:12-16). In this context some writers have referred to the community college as "democracy's college" (9:3). Proponents of the open-door concept of admissions have insisted that the community college, with its willingness to offer courses below the collegiate level, has been the salvation of the remedial student (3:268).

While it is true that community junior colleges have established courses and curricular programs to accommodate low-achieving students, little research has been produced that demonstrates the success of these programs in remedying student deficiencies. Two-year institutions have tended to implement courses and programs in a trial-and-error fashion hoping that students will succeed, but having little evidence that they will.

By far the majority of students who enroll in remedial courses fail to complete the course satisfactorily and are doomed to failure or forced to terminate their education. A state-wide investigation of students enrolled in remedial English classes in California public junior colleges found that from 40 to 60 percent earned a grade of "D" or "F" (4:2). The attrition rate in remedial mathematics is similarly high (10:8). Other research indicates that as many as 75 percent of remedial students drop out of college their first year. At present the only tenable value for students enrolled in remedial courses seems to be that it allows the student to say, years after his short tenure, "I went to college." Except for this inestimable benefit, little else is apparent.

The Research Plan

A total explanation and remedy of the above stated junior college problem is well beyond the scope of the present proposed research plan which deals with three questions:

1. Are remedial students less motivated than non-remedial students?
2. Can the performance of remedial students be affected by increasing their motivation?
3. Can the effectiveness of a remedial course be enhanced by modifying instruction in a manner that promotes motivation?

As is indicated by the questions, within the scope is a possible partial explanation which may suggest instructional procedures for improving the effectiveness of remedial classes, programs and curricula. An additional intended outcome of the research plan is greater faculty involvement in the possibilities of institutional research for supplying answers and direction to educational problems.

The partial explanation of the stated problem, the remedial student's lack of success, is based on a theory of achievement motivation that is advanced by John W. Atkinson and Norman T. Feather (2:11-48). This theory, referred to as need achievement (n achievement) theory, and related research suggest that people differ in their motivation to be successful (M_s) and their motivation to avoid failure (M_{af}). According to the theory these motivations are directly related to one's effort at a task or level of performance. From this relationship the partial explanation is deduced - on the average the motivation to be successful (M_s) is lower for remedial students than for non-remedial students, and the motivation to avoid failure (M_{af}) is higher for remedial students than non-remedial students. This explanation, an assumption, is frequently asserted in the general statement, "these students lack motivation."

The research coordinator who implements the research plan, can capitalize on several characteristics of the plan to promote faculty involvement in institutional research. For example, the research plan includes successive or graduated involvement of faculty in research activities, minimal interference with the subject matter content of classes, and faculty knowledge of the research results and of the theory on which the research is based.

Successive faculty involvement is accomplished through three separate research designs. Each design is an individual unit that provides information relevant to the following design. The first requires the least amount of faculty involvement. That involvement is simply knowledge of a survey or, at the most, the handling of survey forms. Design two includes an experimental procedure that requires the involved faculty to manipulate classroom conditions for a short time during one or two class

periods. The final design, a course evaluation, requires occasional faculty involvement over a semester's time. Following the completion of each research procedure, faculty members are informed of the results and implications for further research and for eventual instructional modifications. The detailed procedures for each of these designs follow a description of the n achievement theory.

The n achievement theory explains a person's motivation, meaning his amplitude or vigor of action at a task, through the variables of motive, expectancy, and incentive. In the context of n achievement theory, these variables have the following definitions (2:12-13):

1. motive - a disposition or tendency to try for a kind of satisfaction or avoid a dissatisfaction. (Note the distinction between "motive" and motivation. A motive is a disposition that affects motivation, one amplitude or vigor of action.)
2. expectancy - an anticipation that an act or certain behavior will be followed by a particular consequence.
3. incentive - the relative attractiveness of a reward or goal.

Motives, M_s and M_{af}, are conceived of as general and stable characteristics that are learned during childhood experiences (McClelland, 1953). In regard to this, the present research designs are not concerned with changing motives; they are concerned with the manipulation of classroom environments to promote motive directed behavior. Motive directed behavior occurs when environmental cues indicate that some performance will lead to achievement.

The strength of an expectancy depends on the subjective probability of the anticipated consequence. One's subjective assessment of probability also depends on environmental cues which may suggest high probability

(approaching 1.0) or low probability (approaching 0.0). When the consequence has an intermediate subjective probability, the expectancy value may range from .1 to .9.

The incentive value of a goal or reward is assumed to be related to the difficulty of obtainment. If easily obtained, the expectancy value is high and the incentive value is low; if difficult to obtain, the expectancy value is low and the incentive value is high. Therefore, the incentive value of a goal also ranges from 0.0 to 1.0. This value increases as the value of the goal increases.

Since two motives, the motive to be successful (M_s) and the motive to avoid failure (M_{af}), are used to explain one's resultant motivation, two expectancy and two incentive values appear in the formulation of the theory: the expectancy of success (P_s), the expectancy of failure (P_f), the incentive value of success (I_s) and the negative incentive value of failure ($-I_f$). The expectancy or subjective probability of failure (P_f) increases as the P_s decreases; therefore, $P_f = I - P_s$. In other words, if the P_s is high, then the P_f is low. The negative incentive value of failure increases as the P_s increases; $-I_f = -P_s$. This indicates that the incentive value to avoid failure is high when the probability of success is high or when the task is easy.

The formulation of the theory combines the above variables (2:35):

$$\text{Resultant motivation} = (M_s \times P_s \times I_s) + (M_{af} \times P_f \times -I_f)$$

This formulation is used as a model and shows the relationship between the variables and motivation. The resultant motivation is indicative of the effort one expends at a task and is equal to the sum of motivation to succeed and motivation to avoid failure. Since motivation to avoid failure,

the value ($M_{af} \times P_f \times -I_f$), is always negative, there is no effort expended when this value is greater than motivation to succeed, the value ($M_s \times P_s \times I_s$). When motivation to succeed is the larger, the effort expended depends on the variables M_s, P_s, and I_s. M_s is a constant value and depends on the person confronted with a task. P_s and I_s depend on the environmental cues present with the motivating situation and can range in value from 0.0 to 1.0. When possible values for P_s and I_s are substituted in the formula (for example .1, .2, .3, etc.), the resultant motivation is maximized when $P_s = 0.5$ (2:16). This is interpreted to mean that when motivation to succeed is greater than motivation to avoid failure, one's resultant motivation or expended effort at a task can be maximized by adjusting environmental cues so that the subjective probability of success approaches 0.5, a fifty-fifty chance of success. As the tasks become more difficult or easier, the resultant motivation decreases. In a similar manner, the motivation to avoid failure is maximized when the subjective probability of success is 0.5. Therefore, when motivation to avoid failure is greater than the motivation to succeed, the greatest reluctance to expend effort at a task occurs when the probability of failure is 0.5. Reluctance is minimized as the task becomes easier or harder since there is little embarrassment when one fails at a difficult task, and there is little possibility of failing at an easy task.

In view of the assumption used for a partial explanation of the remedial students' lack of success, that remedial students lack motivation, n achievement theory suggests the following direction: maximize resultant motivation by manipulating the classroom environment to provide cues that promote motive directed behavior and vary expectancy values of success.

Specific procedures for manipulating the environment are presented with design II.

The Research Procedure

The research procedures for the three designs deal respectively with the following questions:

1. Do remedial students have a significantly lower motive to succeed than non-remedial students?
2. Can the performance of remedial students be altered by manipulating motive-related cues in the classroom environment?
3. Can the effectiveness of a remedial course be enhanced by modifying instruction according to n achievement theory?

Results of design I, a survey, will provide information for judging the validity of the assumption concerning remedial students; the remedial student's lack of success is due, in part, to a lack of motivation. There are two reasons this assumption may not be supported: (1) the assumption is not true or (2) the questionnaire used to measure motive to succeed is not accurate. That the questionnaire is probably accurate enough for the present usage can be demonstrated by the manner it was constructed and results of previous usage (5), (6). Therefore, if the assumption is not supported, a further course of action may be to explore other possible explanations for lack of success. Other explanations could consider social, attitudinal, or intellectual factors. If the assumption is supported, the further course of action is design II.

Design II outlines an experimental procedure. This procedure is intended to increase the quality of student performance by manipulating or providing motivational cues in the classroom. If student performance

is not increased, it may be concluded that resultant motivation has not been affected by the procedure or that classroom performance is not related to motivational changes. If the quality of performance is increased by the procedure, then there is reason to modify instruction on the basis of n achievement theory. The content of design III is a procedure for evaluating the effectiveness of a course that has incorporated such instructional modifications.

Design I: A Survey

The purpose of this survey is to obtain data for answering the following question: Do remedial students have a significantly lower motive to succeed than non-remedial students? Step one of the design is to select two groups, a remedial and a non-remedial group; the groups are respectively Group I and Group II. Step two is the administration and scoring of the Personality Questionnaire which serves as a measure of the motive to succeed. The final step is a statistical treatment of the scores to determine if there is a significant difference between the two groups.

1. Selection of Groups

It is not necessary to have every student complete the questionnaire. A representative sample is sufficient. The size of the sample depends on practical considerations: the size of the school, the personnel involved in the survey, and the amount of time devoted to the survey. As a general guideline, select a percentage of the students, both remedial and non-remedial, that results in at least 20 students in both groups and at the most no more students than can be practically handled. After deciding on the number of students to select for the groups, one can use the table of random numbers (Table I) for obtaining representative samples. As an example, the following steps show how to select a 10 percent sample from 50 remedial and 70 non-remedial students:

A. Assign each student a number. Remedial students have numbers ranging from 1 to 50; non-remedial students 1 to 70.

B. Assemble a deck of 40 cards and give each card a number from 1 to 40.

TABLE 1

TABLE OF RANDOM NUMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	22	17	68	65	84	68	95	23	92	35	87	02	22	57	51	61	09	43	95	06	10	27	53	96	23	71	50	54	36	23	54	31	04	82	98	04	14	12	15	09
2	19	36	27	59	46	13	79	93	37	55	39	77	32	77	09	85	52	05	30	62	28	41	50	61	88	64	85	27	20	18	83	36	36	05	56	39	71	65	09	62
3	16	77	23	02	77	09	61	87	25	21	28	06	24	25	93	16	71	13	59	78	34	21	42	57	02	59	19	18	97	48	80	30	03	30	98	05	24	67	70	07
4	78	43	76	71	61	20	44	90	32	64	97	67	63	99	61	46	38	03	93	22	61	81	77	23	23	82	82	11	54	08	53	28	70	58	96	44	07	39	55	43
5	03	28	28	26	08	73	37	32	04	05	69	30	16	09	05	88	69	58	28	99	61	15	18	13	54	16	86	20	26	88	90	74	80	55	09	14	53	90	51	17
6	93	22	53	64	39	07	10	63	76	35	87	03	04	79	88	08	13	13	85	51	91	76	21	64	64	44	91	13	32	97	75	31	62	66	54	84	80	32	75	77
7	78	76	58	54	74	92	38	70	96	92	52	06	79	79	45	82	63	18	27	44	00	97	79	08	06	37	30	28	59	85	53	56	68	53	40	01	74	39	59	73
8	23	68	35	26	00	99	53	93	61	28	52	70	05	48	34	56	65	05	61	86	36	46	18	34	94	75	20	80	27	77	78	91	69	16	00	08	43	18	73	68
9	15	39	25	70	99	93	86	52	77	65	15	33	59	05	28	22	87	26	07	47	88	98	99	60	50	65	95	79	42	94	93	62	40	89	96	43	56	47	71	66
10	58	71	96	30	24	18	46	23	34	27	85	13	99	24	44	49	18	09	79	49	04	37	59	87	21	05	02	03	24	17	47	97	81	56	51	92	34	86	01	82
11	57	35	27	33	72	24	53	63	94	09	41	10	76	47	91	44	04	95	49	66	63	62	06	34	41	94	21	78	55	09	72	76	45	16	94	29	95	81	83	83
12	48	50	86	54	48	22	06	34	72	52	82	21	15	65	20	33	29	94	71	11	78	47	23	53	90	34	41	92	45	71	09	23	70	70	07	12	38	92	79	43
13	61	96	48	95	03	07	16	39	33	66	98	56	10	56	79	77	21	30	27	12	87	68	62	15	43	53	14	36	59	25	54	47	33	70	15	59	24	48	40	35
14	36	93	89	41	26	29	70	83	63	51	99	74	20	52	36	87	09	41	15	09	47	60	92	10	77	88	59	53	11	52	66	25	69	07	04	48	68	64	71	06
15	18	87	00	42	31	57	90	12	02	07	23	47	37	17	31	54	08	01	88	63	56	88	87	59	41	65	28	04	67	53	95	79	88	37	31	50	41	06	94	76
16	88	56	53	27	59	33	35	72	67	47	77	34	55	45	70	08	18	27	38	90	02	57	45	86	67	73	43	07	34	48	44	26	87	93	29	77	09	61	67	84
17	09	72	95	84	29	49	41	31	06	70	42	38	06	45	18	64	84	73	31	65	31	54	14	13	17	48	62	11	90	60	68	12	93	64	28	46	24	79	16	76
18	12	96	88	17	31	65	19	69	02	83	60	75	86	90	68	24	64	19	35	51	28	50	16	43	36	28	97	85	58	99	67	22	52	76	23	24	70	36	54	54
19	85	94	57	24	16	92	09	84	38	76	22	00	27	69	85	29	81	94	78	70	63	29	62	66	50	02	63	45	52	38	67	63	47	54	75	83	24	78	43	20
20	38	64	43	59	98	98	77	87	68	07	91	51	67	62	44	40	98	05	93	78	45	65	58	26	51	76	96	59	38	72	86	57	45	71	46	44	67	76	14	55
21	53	44	09	42	72	00	41	86	79	79	68	47	22	00	20	35	55	31	51	51	39	65	36	63	70	77	45	85	50	51	74	13	39	35	22	30	53	36	02	95
22	40	76	66	26	84	57	99	99	90	37	36	63	32	08	58	37	40	13	68	97	73	71	98	16	04	29	18	94	51	23	76	51	94	84	86	79	93	96	38	63
23	02	17	79	18	05	42	59	52	57	02	22	07	90	47	03	28	14	11	30	79	72	20	56	20	11	72	65	71	08	86	79	57	95	13	91	97	48	72	66	48
24	95	17	82	06	53	31	51	10	96	46	92	06	88	07	77	56	11	50	81	69	75	17	26	99	76	89	37	20	70	01	77	31	61	95	46	26	97	05	73	51
25	35	76	22	42	92	96	11	83	44	80	34	68	35	48	77	33	42	40	90	60	37	48	60	82	29	81	30	15	39	14	48	38	75	93	29	06	87	37	78	48
26	26	29	13	56	41	85	47	04	66	08	34	72	57	59	13	82	43	80	46	15	68	08	02	80	72	83	71	46	30	49	89	17	95	88	29	02	39	56	03	46
27	77	80	20	75	82	72	82	32	99	90	63	95	73	76	63	89	73	44	99	05	14	23	98	61	67	70	52	85	01	50	01	84	02	78	43	10	62	98	19	41
28	46	40	66	44	52	91	36	74	43	53	30	82	13	54	00	78	45	63	98	35	49	08	96	21	44	25	27	99	41	28	07	41	08	34	66	19	42	74	39	91
29	37	56	08	18	09	77	53	84	46	47	31	91	18	95	58	24	16	74	11	53	78	37	06	08	43	63	61	62	42	29	39	68	95	10	96	09	24	23	00	62
30	61	65	61	68	66	37	27	47	39	19	84	83	70	07	48	53	21	40	06	71	37	21	34	17	68	68	96	83	23	56	32	84	60	15	31	44	73	67	34	77
31	93	43	69	64	07	34	18	04	52	35	56	27	09	24	86	61	85	53	83	45	14	29	09	34	04	87	83	07	55	07	76	58	30	83	64	87	29	25	58	84
32	21	96	60	12	99	11	20	99	45	18	48	13	93	55	34	18	37	79	49	90	58	43	28	06	36	49	52	83	51	14	47	56	91	29	34	05	87	31	06	95
33	95	20	47	97	97	27	37	83	28	71	00	06	41	41	74	45	89	09	39	84	10	43	67	29	70	80	62	80	03	42	10	80	21	38	84	90	56	35	03	09
34	97	86	21	78	73	10	65	81	92	59	58	76	17	14	97	04	76	62	16	17	44	38	88	39	54	86	97	37	44	22	00	95	01	31	76	17	16	29	56	63
35	69	92	06	34	13	59	71	74	17	32	27	55	10	24	19	23	71	82	13	74	90	69	59	19	51	85	39	52	85	13	07	28	37	07	61	11	16	36	27	03
36	04	31	17	21	56	33	73	99	19	87	26	72	39	27	67	53	77	57	68	93	41	47	10	25	62	97	05	31	03	61	20	26	36	31	62	68	69	86	95	44
37	61	06	98	03	91	87	14	77	43	96	43	00	65	98	50	45	60	33	01	07	91	94	14	63	19	75	89	11	47	11	31	56	34	19	09	79	57	92	36	59
38	85	93	85	86	88	72	87	08	62	40	16	06	10	89	20	23	21	34	74	97	80	06	54	18	66	09	18	94	06	19	98	40	07	17	81	22	45	44	84	11
39	21	74	32	47	45	73	96	07	94	52	09	65	90	77	47	25	76	16	19	33	67	72	77	63	48	84	08	31	55	58	24	33	45	77	58	80	45	67	93	82
40	15	69	53	82	80	79	96	23	53	10	65	39	07	16	29	45	33	02	43	70	59	40	24	13	27	79	26	88	86	30	01	31	60	10	39	53	58	47	70	93

C. Shuffle the cards and draw one. Use the number on the card to designate the row for entering the table of random numbers (e.g. card number 36).

D. Reshuffle the cards and draw another to designate the column for entering the table of random numbers. (e.g. card number 26).

E. Enter the table at row 36 and column 26 where the number 97 is found. Read down column 26 and select the first five numbers (10 percent of 50) that are smaller than 50, skipping numbers that are too large and moving to column 27 when the bottom of column 26 is reached.

F. List the numbers 9, 19, 30, 20, and 2. The remedial students with these numbers form Group I.

G. Repeat steps C through F to select 7 non-remedial students to form Group II.

If the number of students from which the sample is selected is over 100, consider the columns as if they were in divisions of three digits. In other words, use the number to the right of the two digit numbers. In this case the number at the point of entry is 970. The next two numbers down are 758 and 91. For larger institutions the table of random numbers can be used for the selection of remedial and non-remedial classes instead of individual students.

2. Administration and Scoring of the Questionnaire

The personality questionnaire (Table 2) measures two kinds of achievement motivation. Scale I, the first ten items, measures "the need to do well at a task"; scale II, the last 14 items, measures the "need to be a success" (5). Previous research (6) found that scores on scale I were related to performance on examinations; scores on scale II

were not. Since the eventual goal is to affect quality of performance, the primary interest is whether or not the groups score significantly different on scale I.

Table 2

Personality Questionnaire[1]

Item number and content	Keyed response[2]
Scale I[2]	
1. Are you inclined to read of the successes of others rather than do the work of making yourself a success?	no
2. Would you describe yourself as an ambitious person?	yes
3. Do you work for success rather than daydream about it?	yes
4. Would you describe yourself as being lazy?	no
5. Do you usually work to do more than just get through an examination?	yes
6. Will days often go by without your having done a thing?	no
7. Do you do things "today" rather than putting them off to do "tomorrow"?	yes
8. Are you inclined to take life as it comes without much planning?	no
9. Do you work hard at a job?	yes
10. Do you, or did you, do little preparation for examinations?	no
Scale II	
11. Do you grow excited when telling someone about the work you are doing?	yes
12. Do you usually remain free from boredom when on holiday?	no
13. Are you very interested in the lives of successful people?	yes
14. Do you remain relaxed at the thought of a difficult task you are about to undertake?	no

Table 2 continued

Item number and content	Keyed response[2]
15. Are you usually unimpressed by how hard others work?	no
16. Are you usually able to sleep even when engaged in an exciting job?	no
17. Are you usually awed in the presence of very successful people?	yes
18. Can you usually concentrate on what people are saying to you even when an important job is unfinished?	no
19. Does the great achievement of others sometimes make you feel small?	yes
20. Have you at any time tried to model your life on that of a successful person?	yes
21. Do you readily forget your work when you are on holiday?	no
22. Are you influenced by those around you in the amount of work you do?	yes
23. Do you usually remain free from envy when others are successful?	no
24. Do you often compare how well you can do something with how well others can do it?	yes

1. Items for the Personality Questionnaire are reproduced with the permission of C.G. Costello of the University of Calgary and The Journal of Psychology.
2. When reproducing the items for student use, do not include the keyed responses nor the scale of designations.

Before the students answer the 24 items, read the following orientation and instructions:

> The questions on the following pages have been designed to show where you should be placed on certain personality traits. There are no "right" or "wrong" answers to these questions. It is, therefore, impossible to get a "good" or a "bad" score on this personality scale. Each question is to be answered yes or no. All the questions must be answered by choosing only one of the two alternative answers.

The items should be presented to the students in the same order as they appear in Table 2, omitting scale designations and keyed responses. If desired, the questionnaire can be designed for machine scoring.

A student's score on each of the scales is the number of responses that match the keyed responses in the right hand column of Table 2.

3. Statistical Treatment of Scores

At this point there are two groups and each member of both groups has two scores, one for scale I and one for scale II. The groups will be statistically compared twice, once using scale I scores and once using scale II scores. The same calculations apply to both comparisons. The statistical test used for these comparisons is a "t test". This test will indicate whether or not there is a significant difference, one that is not likely to be a chance difference, in questionnaire scores between the groups. If there is a significant difference and group I scores lower on scale I than group II, then the assumption that remedial

students lack motivation - in comparison with non-remedial students - is supported.

Below are the calculations required for a t test. Sample scores for scale I are used to obtain four values that will be substituted for A, B, C, and D in the following formula:

$$t = \frac{A - B}{\sqrt{C + D}}$$

Value A represents the <u>mean score</u> for the non-remedial group, group II. Calculate A by adding all group II scores and dividing this value by the number of students in the group.

Example

Group II Students	Scale I Scores
1	9
2	8
3	8
4	5
5	9
6	7
7	10
	total = 56

$$A = \frac{56}{7}$$

$$A = 8$$

Value B represents the mean score for the remedial group, group I

Example

Group I Students	Scale I Scores
1	1
2	4
3	5
4	3
5	2
	total = 15

$$B = \frac{15}{5}$$

$$B = 3$$

If value B is equal or greater than A, the t test will not support the assumption. If A is larger than B, complete the calculations.

Value C requiress series of calculations with group II scores.

Value D requires the calculations with group I scores:

Directions for calculations	Group II example Student	Score	Score^2	Group I example Student	Score	Score^2
1. Square each score and sum the resultant values.	1	9	81	1	1	1
	2	8	64	2	4	16
	3	8	64	3	5	25
	4	5	25	4	3	9
	5	9	81	5	2	4
	6	7	49		total =	55
	7	10	100			
		total =	464			

2.	Multiply the values obtained in step 1 by the number of students in the respective groups.	$7 \times 464 = 3{,}248$	$5 \times 55 = 275$
3.	Square the sum of each group's scores. These sums have already been found during the calculation of values A and B.	$56^2 = 3{,}136$	$15^2 = 225$
4.	Subtract the values obtained in step 3 from the values obtained in step 2.	$3{,}248 - 3{,}136 = 112$	$275 - 225 = 50$
5.	Multiply the number of students in each group by the number of students minus one.	$7 \times (7 - 1) = 42$	$5 \times (5 - 1) = 20$
6.	Divide the values obtained in step 4 by the values obtained in step 5.	$\frac{112}{42} = 2.67$	$\frac{50}{20} = 2.50$
7.	Values C and D equal the resultant values in step 6.	$C = 2.67$	$D = 2.50$

Use the values for A, B, C, and D and solve for t.

$$t = \frac{A - B}{\sqrt{C + D}} = \frac{8 - 3}{\sqrt{2.67+2.50}} = \frac{5}{\sqrt{5.17}} = \frac{5}{2.27}$$

$$t = 2.20$$

The final step in the statistical treatment is to determine if the t value, 2.20 in the example, is large enough to indicate a significant difference between the groups. Table III is designed for this purpose. First, add the number of students in group I to the number in group II. In the above example five is added to seven. The sum, 12, is then located

in the left-hand column of Table III, "total number of students." The corresponding value in the right-hand column, t value needed, is the smallest t value needed for a significant difference. For a total of 12 students a value of 1.81 or more is needed. The t value in the example, 2.20, is greater than 1.81; therefore, the difference between the groups in the example is significant. If the t value indicates a significant difference, then it is assumed that the difference between the two groups is a real difference and that the data support the proposed partial explanation for the remedial student's lack of success: on the average the motivation to be successful is lower for remedial students than for non-remedial students. If the t value indicates that the difference between the groups is not significant, then the difference is assumed to be a chance difference that reflects no real meaning.

The same calculations and test for significance are used for scale II scores.

Summary

With the completion of design I, one is in a position to state the motivational characteristics of the remedial students. The statement characterizing the students has the support of an empirical observation, the survey, and specific meaning since it refers to an established motivational theory.

If there is a significant difference between the groups on scale I and scale II, then the conclusion is a lack of motivation on behalf of the remedial students. This conclusion can be used for directing decision-making and changing remedial instruction. Design II, an experiment, is a research procedure that can be used to assess the effectiveness of such changes.

TABLE 3

Values Needed for Significant Results[1]

Total number of students[2]	t value needed[3]
12	1.812
13	1.796
14	1.782
15	1.771
16	1.761
17	1.753
18	1.746
19	1.740
20	1.734
21	1.729
22	1.725
23	1.721
24	1.717
25	1.714
26	1.711
27	1.708
28	1.706
29	1.703
30	1.701
31	1.699
32	1.697
42	1.684
62	1.671
122	1.658
Over 122	1.645

1. Table compensates for degrees of freedom.
2. Includes both groups.
3. Values are for a one-tailed test at the .05 level.

Design II: An Experiment

Design II is an experimental research procedure for answering the following question: Can the performance of remedial students be altered by manipulating achievement motive-related cues in the classroom environment? Generally achievement motive-related cues suggest a standard of excellence and are found with the following situations and conditions (11:181), (12:402-404):

1. a competitive situation.
2. a situation in which performance is compared with criteria of acceptability.
3. a situation requiring social acceptance.
4. a situation in which one's performance is indicative of his intelligence.
5. a situation in which one's performance is indicative of his leadership capabilities.
6. the presence of a task which is or should be of importance.
7. the presence of an authority figure.
8. the presence of a male figure.
9. the presence of achievement related words (e.g. "success" and "strive").
10. an elaborate, impressive setting (e.g. modern and/or technical).

Promoting any of the above situations is a means of promoting achievement motive-directed behavior. Similar to previous research (11:403) this experiment will provide motivational cues through the instructions given prior to a test. The experiment consists of five steps: (1) the selection of students, (2) the selection of a test, (3) the administration of the test, (4) the statistical treatment of the scores, and (5) the interpretation of the results.

1. Selection of Students

Only one group of remedial students is needed for the experiment. This group can consist of one or more remedial classes with the same subject - matter content. At least one entire class should be used. If possible, several classes should be selected at random - for procedure see Design I - from all possible classes.

2. Selection of a Test

The test used will depend on the class subject-matter of the selected remedial students. The test should meet the following criteria:

1. The test should be standardized with alternate forms (e.g. form A and B).
2. The test should be short enough to allow completion within one class period.
3. The test should be appropriately difficult for the remedial students.

In regard to the last criterion, a test should be selected according to the grade level at which the remedial students perform. For example, if the students perform at a tenth grade level in English, an English test designed for the ninth, tenth, and eleventh grades is appropriate.

3. Administration of the Test

Administration of the standardized test is the key part of the experimental procedure. The test will be administered twice, once with instructions and statements that are designed to produce achievement motive-directed behavior (the motivating condition) and once without such instructions and statements (the non-motivating condition). The procedure for administering the test is designed to eliminate other possible factors that could account for the students performing better during the motivating condition. For the motivating condition, the first administration of the test, the procedure consists of five steps:

1. Assign the number "one" to every other male in the classroom. To each alternate male, assign the number "two". In the same manner assign numbers to the female students.
2. Divide the class by putting "ones" on one side of the room and "twos" on the other.
3. Pass out form A of the test to "ones" and form B to "twos".
4. Review the test instructions and sample problems.
5. Before the students start the test, inform them of the following: This test was especially chosen to provide an index of your ability in (insert subject matter of test). The test will also indicate how you compare, in terms of (insert subject matter of test) ability, with students like you in other schools. So I have a true picture of what your (insert subject matter of test) talents are, it is important that you do as well as possible.

The second administration of the test should follow as soon as possible to prevent the students from having learning experiences that will raise their scores. Also, prior to the second administration of the test, the students should not receive any information on how they performed on the first testing. Such information would influence their expectancy of success or failure and therefore affect their motivation for the second testing. There are two steps for the second administration of the test:

1. Pass out form B of the test to "ones" and form A to "twos".
2. Before the students start the test, inform them of the following: This test is similar to the one you took (insert day of first testing). The principal reason I am giving the test is to see how useful it might be for this course. The score you get will not influence your grade.

4. Statistical Treatment of Test Scores

In the statistical treatment for design I, two sets of scores, each from a different group, were compared. Here the statistical treatment will compare two sets of scores obtained from the same group under two conditions. This situation requires that a different procedure be used for calculating a t value (7:169-171). Below are the calculations required. Sample scores for seven students are used to calculate four values that will be substituted for E, F, G, and H in the following formula:

$$t = \frac{E}{\sqrt{\frac{(F - G)}{H}}}$$

Before calculating values for the formula, list the following numbers for each student who took both tests: (1) the score for test one, (2) the score for test two, (3) the difference between the two scores (test one score minus test two score), and (4) the difference squared.

Example

	(1)	(2)	(3)	(4)
Student	Test one score	Test two score	Difference	Difference^2
1	35	36	-1	1
2	25	21	4	16
3	40	37	3	9
4	30	32	-2	4
5	50	42	8	64
6	55	54	1	1
7	45	39	6	36
			total = 19	total = 131

Value E is equal to the sum of the difference in column 3.

E = 19

If E is zero or a negative number, the t value will not be significant. If E is a positive number, continue the calculations to determine if the t value is significant.

Value F is equal to the sum of the differences squared, the sum of column 4, multiplied by the number of students.

$$F = 7 \times 131$$

$$F = 917$$

Value G is equal to value E squared.

$$G = E^2 = 19^2$$

$$G = 361$$

Value H is equal to the number of students minus one.

$$H = 7 - 1$$

$$H = 6$$

Use the values for E, F, G, and H and solve for t.

$$t = \frac{E}{\sqrt{\frac{(F-G)}{H}}} = \frac{19}{\sqrt{\frac{(917-361)}{6}}} = \frac{19}{\sqrt{\frac{556}{6}}}$$

$$t = \frac{19}{\sqrt{92.67}} = \frac{19}{9.62} = 1.10$$

The final step is to determine if the t value is large enough to indicate a significant difference between the two sets of test scores. The procedure for determining if a t value is significant is described in design I on pages 18 and 19. One modification is required for the t value calculated for design II. Instead of using the actual number of students for whom there are test scores, use the number of students plus one. For example, if there are test scores for 20 students, use the number 21 for entering the left-hand column of Table 3. In this case, a t value of 1.729 is needed to

indicate a significant difference.

Summary

Design II is a procedure to determine if the performance of remedial students can be enhanced by providing motivational cues. If the t value is significant, meaning the students performed significantly better during the motivating condition, then the data supports the conclusion that performance can be enhanced. Such a conclusion suggests the value of modifying remedial instruction according to the implications of n achievement theory. Such implied modifications are presented in design III.

Design III: A Course Evaluation

The content of design III is a procedure for evaluating the effectiveness of a course that incorporates instructional modifications based on n achievement theory. The question is whether or not students learn more in a class with such modifications. The evaluation requires two comparable groups of remedial students and a criterion for assessing learning.

Comparable groups can be formed by randomly dividing a group of remedial students who have the same course with the same teacher. The group needs to be large enough to form two classes. The procedure for random selection described on pages 9 through 11 can be used to select half the males and half the females (Class I) for the class with modified instruction. The remaining half (Class II) is for the non-modified class.

The criterion for assessing student learning will depend on the preference of the instructor. The only requirement for the criterion, probably test performance, is that student learning be reflected by a score, not percentiles nor grade averages. The measurement of student learning will be taken for both classes at the end of the course.

Except for the instructional modifications incorporated for class I, the instructional procedures for both classes should be those generally used by the instructor. The extent of the modifications for class I will depend on the ingenuity and flexibility of the instructor. Several suggestions for modifying instructional procedures follow:

1. As a routine, promote situations (see page 21) that stimulate achievement motive-directed behavior. This could include visitors who are authority figures, an emphasis on acceptable performance criteria, explanations of the importance of assignments, etc.

2. Allow students to select assignments from alternative assignments that are perceived as ranging in level of difficulty. This will allow students to minimize their motivation to avoid failure and maximize their motivation to succeed since they are able to adjust their subjective probability of success.
3. Adjust the perceived difficulty of the class by periodically giving easier or more difficult tests and quizzes. This depends on whether or not the students perceive the class as too easy or difficult.

After criterion scores are obtained for both classes, class I can be statistically compared with class II by using the same t test described in design I on pages 15 through 19. While calculating the values required for determining t, consider the students in class I as group I and the students in class II as group II. If the t value is significant, there is support to the conclusion that the effectiveness of a remedial class can be enhanced by modifying instruction according to n achievement theory.

REFERENCES

1. Atkinson, John W. Motives in Fantasy, Action, and Society. Princeton, New Jersey: D. Van Nostrand C., Inc., 1958.

2. Atkinson, John W., Feather, Norman T. A Theory of Achievement Motivation. New York: John Wiley & Sons, Inc., 1966.

3. Blocker, Clyde E., Plummer, Robert H., and Richardson, Richard C., Jr. The Two-Year College: A Social Synthesis. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965.

4. Bossone, Richard M. Remedial English Instruction in California Public Junior Colleges. Sacramento: State Department of Education, September, 1966.

5. Costello, C. G. "Two Scales to Measure Achievement Motivation." The Journal of Psychology 66: 231-235; 1967.

6. Costello, C. G. "Need Achievement and College Performance." The Journal of Psychology 69: 17-18; 1968.

7. Ferguson, George A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill, Inc., 1966.

8. Florida State Department of Education. The Community Junior College in Florida's Future. Tallahassee, 1967.

9. Gleazer, Edmund J., Jr., editor. American Junior Colleges. Sixth edition. Washington, D. C.: American Council on Education, 1963.

10. Kipps, Carol. Basic Arithmetic Offered in California Public Junior Colleges. Unpublished doctoral dissertation. Los Angeles: University of California, 1966.

11. McClelland, David C. and others. Achievement Motive. New York: Appleton-Century-Crofts, Inc., 1953.

12. McClelland, David C., editor. Studies in Motivation. New York: Appleton-Century-Crofts, Inc., 1955.

13. Sugarman, Michael N. "What About the Dropouts?" Michigan Education Journal 44: 43; April, 1967.